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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,025	09/27/2004	Tadahiko Sakai	2004_1461A	3434

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EXAMINER

HARRISON, MONICA D

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 09/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/509,025

Applicant(s)

SAKAI ET AL.

Examiner

Monica D. Harrison

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6 and 9-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 9-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 9/23/04 12/22/04

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 6 and 11-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Sunohara (6,958,544 B2).

2. Regarding claim 1, Sunohara discloses a semiconductor device comprising: a semiconductor element that has a first surface on which an external connection terminal is formed and a second surface that faces the first surface, and a thickness of 10 μ m or more and 150 μ m or less (Figure 6D, reference 20); a plate that faces the second surface (Figure 6D, reference 50); and a resin binder that adheres the second surface and the plate, wherein the plate has the rigidity higher than that of the semiconductor element; an outer shape of the plate is larger than that of the semiconductor element (Figure 6D, references 24-26); and the resin binder covers a side face of the semiconductor element, and furthermore at a portion that is interposed between the second surface and the plate the resin binder allows the semiconductor element to deform in a thickness direction thereof (Figure 6D, reference 24).

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3. Regarding claim 2, Sunohara discloses wherein the resin binder covers an edge that is formed of a side face and the second surface of the semiconductor element (Figure 6D, reference 24).

4. Regarding claim 3, Sunohara discloses wherein the resin binder covers the side face over an entire circumference of the semiconductor element (Figure 6D, reference 24).

5. Regarding claim 4, Sunohara discloses wherein the resin binder covers only a corner of the side of the semiconductor element (Figure 6D, reference 24).

6. Regarding claim 6, Sunohara discloses wherein the external connection terminal is provided with a bump (Figure 6E, reference 38).

7. Regarding claim 11, Sunohara discloses a semiconductor device assembling method in which a semiconductor element and a plate that is higher in the rigidity than the semiconductor element are adhered with a resin binder, the semiconductor element having a first surface on which an external connection terminal is formed and a second surface that faces the first surface, the second surface being adhered to the plate, comprising: a first step of roughly processing according to mechanical polishing a side opposite to the first surface on which an external connection terminal of the semiconductor element is formed, followed by further applying finishing to obtain a second surface from which a damaged layer is removed and to make a thickness of the semiconductor element $10\mu\text{m}$ or more and $150\mu\text{m}$ or less (column 2, lines 49-63); a second step of supplying the resin binder (Figure 6D, reference 24) to a plate member including the plate (Figure 6D, reference 50); a third step of adhering the second surface and the plate in an aligned state by use of the resin binder (Figure 6D); and a fourth step of cutting the plate from the plate member (column 1, lines 34-46).

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8. Regarding claim 12, Sunohara discloses wherein in the third step, the resin binder is formed with an outer periphery of the semiconductor element covered (Figure 6D, references 24-26).

9. Regarding claim 13, Sunohara discloses wherein by use of a decrease in the viscosity of the resin binder owing to heating, the resin binder is spread to a side face of the semiconductor element to cover the outer periphery (Figure 6D, reference 24-26).

10. Regarding claim 14, Sunohara discloses wherein the second step is a step of supplying a resin binder by an amount necessary to cover a side face of the semiconductor element (Figure 6D, reference 24-26).

11. Regarding claim 15, Sunohara discloses wherein in the second step the resin binder supplied is liquid, the plate member has a projection surrounding the plate, and the liquid resin is supplied inside of the projection (column 13, lines 36-55).

12. Regarding claim 16, Sunohara discloses wherein the resin binder is in sheet, and the second step is a step of adhering the resin binder sheet to the plate member (Figure 6D).

13. Regarding claim 17, Sunohara discloses wherein the plate member has a plurality of the plates, and the third step includes a step of mounting the semiconductor element through the resin binder for each of the plates that the plate member has and a step of heating the plate member on which the semiconductor elements are mounted (column 5, lines 50-67 thru column 6, lines 1-45; Figure 6D).

14. Regarding claim 18, Sunohara discloses wherein the third step simultaneously carries out the step of mounting and the step of heating (column 5, lines 50-67 thru column 6, lines 1-45; Figure 6D).

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15. Regarding claim 19, Sunohara discloses wherein the second third step is carried out by use of mounting means of the semiconductor element that are provided with heating means (column 5, lines 50-67 thru column 6, lines 1-45; Figure 6D).

16. Regarding claim 20, Sunohara discloses wherein the semiconductor element has a re-wiring layer on the first surface (Figure 5, reference 11).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sunohara (6,958,544 B2) in view of Fujisaki et al (5,942,048).

17. Sunohara discloses all above claimed subject matter except wherein the semiconductor element includes a re-wiring layer on the first surface, the re-wiring layer has a surface electrode formed on a surface and an internal electrode formed inside thereof, and the internal electrode connects the surface electrode and the external connection terminal (claim 9) and wherein the surface electrode is provided with a bump (claim 10).

Fujisaki et al discloses wherein the semiconductor element includes a re-wiring layer on the first surface, the re-wiring layer has a surface electrode formed on a surface and an internal electrode formed inside thereof, and the internal electrode connects the surface electrode and the external connection terminal (column 24, lines 58-64; Figure 10, reference 9406) and wherein the surface electrode is provided with a bump (Figure 10, reference 9407).

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It is obvious, at the time the invention was made, for one having ordinary skill in the art, to modify Sunohara with the teachings of Fujisaki et al, for the purpose of producing a photovoltaic device at low cost with high reliability.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is 571-272-1959. The examiner can normally be reached on M-F 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Monica D. Harrison
AU 2813

mdh
September 21, 2006


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